DIRECT TESTIMONY

OF

STEPHEN A. BYRNE

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2007-229-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Stephen A. Byrne. My business address is South Carolina Electric & Gas Company, 1426 Main Street, Columbia, South Carolina 29201.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by SCE&G as Senior Vice President of Generation and Chief Nuclear Officer.

Q. PLEASE DESCRIBE YOUR EDUCATION AND BUSINESS BACKGROUND.

A. I have a Chemical Engineering degree from Wayne State University. I was granted a Senior Reactor Operator License by the Nuclear Regulatory Commission (NRC) in 1987. After graduation, I started my nuclear career working for the Toledo Edison Company at the Davis-Besse Nuclear Plant. From 1984 to 1995, I held the positions of Shift Technical Advisor, Control Room Supervisor, Shift Manager, Electrical Maintenance Superintendent, Instrument and Controls Maintenance Superintendent, and Operations Manager. I began working for

SCE&G in 1995 as the Plant Manager at the V. C. Summer plant. Thereafter, I was promoted to Vice President at the V.C. Summer plant. In 2004, I was promoted to my present position of Senior Vice President of Generation and Chief Nuclear Officer.

Q. WHAT ARE YOUR DUTIES WITH SCE&G?

A. I am in charge of overseeing the generation of electricity for the Company and, as Chief Nuclear Officer, I also oversee all nuclear operations.

Q. HAVE YOU EVER TESTIFIED BEFORE THIS COMMISSION?

A. Yes. While at V.C. Summer, I testified in a fuel clause proceeding for SCE&G.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to discuss the operating performance and current state of the Company's electric generating units and the environmental regulations and compliance issues facing the Company. My testimony has two broad themes: (1) the Company has expended significant capital since the last electric rate case to maintain its generation capacity and comply with increasingly stringent environmental regulations; and (2) the Company is entering a period of investment in new base load generation to address growing demand for power. One of my objectives today is to discuss the base load generation options available to the Company today in light of current and potential environmental regulations and concerns about greenhouse gases.

Q. PLEASE GIVE A SHORT DESCRIPTION OF SCE&G'S ELECTRIC FACILITIES.

A. SCE&G owns and/or operates ten (10) coal-fired fossil fuel units (2,476 MW), one (1) cogeneration facility (90 MW), eight (8) combined cycle gas turbine/steam generator units (gas/oil fired, 1,352 MW), eighteen (18) peaking turbines (365 MW), four (5) hydroelectric generating plants (247 MW), and one Pump Storage Facility (576 MW). The total net non-nuclear summer generating capability rating of these facilities is 5,106 megawatts. In addition, SCE&G operates the V.C. Summer Nuclear Station ("VCSNS" or "Summer Station") which it owns jointly with the South Carolina Public Service Authority or Santee-Cooper. Summer Station was originally rated to generate 900 MW but over the years SCE&G and Santee-Cooper have invested capital to increase the net dependable output of the plant to 966 MW on a sustained, reliable basis. Combining SCE&G's fossil-hydro capacity with its two-thirds interest in the V.C. Summer plant, the total net generating capability of all SCE&G facilities is 5,750 MW.

Q. HOW MUCH ELECTRICITY WAS GENERATED BY SCE&G IN THE TEST YEAR?

A. In the test year, SCE&G generated 25,928,968 megawatt hours of energy. Of this energy, the fossil steam plants generated 64%, the combined cycle units generated 13%, the gas peaking turbines and hydro facilities generated 4%, and the nuclear plant generated 19%.

Q. PLEASE DISCUSS THE AVAILABILITY OF SCE&G'S FOSSIL PLANTS DURING THE THREE YEARS SINCE THE LAST RATE PROCEEDING.

A. Availability is a measure of the actual hours that the generation units are ready and able to provide electricity divided by the total hours in the 12 twelve-month review period. Availability is not affected by how the unit is dispatched or by the demand from the system when connected to the grid. However, it is impacted by the planned maintenance shutdown hours. During the three years since the last rate case, SCE&G's fossil plant availability was 86%.

The North American Electric Reliability Council ("NERC") national 5-year (2001-2005) average for availability from similar sized pulverized coal fired units was 88%. SCE&G's fossil plant availability was slightly below the NERC average due to a number of major planned outages for boiler maintenance, turbine maintenance and environmental equipment installation. SCE&G's forced outage rate during this three year period (4.4%), however, was substantially less than the 5-year NERC average (5.0%.) In addition, during the summer peak periods (June-September) – which are the periods when fossil plant generation is needed most on SCE&G's system – SCE&G fossil plant availability was 97%. SCE&G's forced outage rate during the summer peak periods 2004-2006 was only 1.6%.

Q. WHAT WAS THE HEAT RATE OF THE FOSSIL UNITS DURING THE PERIOD SINCE THE LAST RATE PROCEEDING?

A. Heat rate is a way to measure thermal efficiency of a power plant fuel cycle. It is the number of British Thermal Units (Btu) of fuel required to generate one (1) kilowatt-hour (kWh) of electricity. The combined steam unit's heat rate for the

period April 1, 2004 through March 31, 2007 is 9693 Btu/kWh. Cope Station had the best heat rate in our system at 9165 Btu/kWh followed by Williams Station at 9574 Btu/kWh and McMeekin Station at 9607 Btu/kWh.

During this period, SCE&G was recognized 3 times by the trade magazine, *Electric Light & Power*, for having multiple plants listed in the top 20 most energy efficient coal fired plants in the nation. In 2005, which is the most recent year for which rankings have been issued, Cope Station ranked 4th at 9214 Btu/kWh, Williams Station ranked 11th at 9462 Btu/kWh and McMeekin Station was ranked 17th at 9552 Btu/kWh. This ranking means that three of the six SCE&G coal fired plants representing over half of our fossil fired generating capacity are ranked in the top 20 plants in the country for efficiency in 2005.

Q. PLEASE DESCRIBE THE PERFORMANCE OF THE COMPANY'S NUCLEAR OPERATIONS.

A. VCSNS has continuously met or exceeded all Nuclear Regulatory Commission ("NRC") requirements and Institute of Nuclear Power Operations ("INPO") standards. During the test period, VCSNS generated 7,445,079 MWHs. VCSNS operated at a capacity factor during the three years since the last test period of 91%. As defined by Section 58-27-865 of the South Carolina Code of Laws, as amended, Summer Station's net capacity factor based on reasonable excludable nuclear system reductions was 101% during the test year and during the three years since the last rate case. VCSNS is typically rated in the top 20 nuclear units

by capacity factor in non-refueling outage years; the last such year was 2004 when the plant was rated number 13 out of 103 plants at 96%.

Q. PLEASE EXPLAIN THE ROLES OF INPO AND THE NRC WITHIN THE NUCLEAR INDUSTRY AND DESCRIBE ANY RANKINGS RECEIVED BY VCSNS FROM THOSE AGENCIES.

A. INPO is a nonprofit corporation established by the nuclear industry to promote the highest levels of nuclear safety and plant reliability. INPO promotes excellence in the industry in the operation of nuclear generating plants. In VCSNS's two most recent ratings—April 2005 and April 2007—INPO rated its overall performance as excellent, with no significant weaknesses noted. These evaluations once again validated that VCSNS is one of the highest rated plants in the industry.

The NRC is responsible for the licensing and oversight of the civilian use of nuclear materials in the United States. During each year since SCE&G's last rate proceeding, the NRC has found that VCSNS operated in a manner that preserved public health and safety and fully met all the reactor oversight process ("ROP") cornerstone objectives.

ENVIRONMENTAL COMPLIANCE

Q. PLEASE DISCUSS THE CAPITAL INVESTMENT THE COMPANY HAS RECENTLY MADE IN ENVIRONMENTAL UPGRADES AT ITS GENERATING PLANTS.

A. Since the last rate case in 2004, the Company has made substantial capital expenditures to reduce emissions of criteria air pollutants such as Nitrogen Oxides

(NOx) and Sulfur Dioxide (SO_2) from its coal fired electric generating units and to reduce potential impacts on water quality. Since 2004, the Company has spent $123 million on environmental projects (including investment in Williams Station which is operated by SCE&G and delivers all its output to SCE&G). The principal projects during this period were:

- The Company completed the installation of NOx control at Williams, McMeekin and Urquhart Stations and started the Selective Catalytic Reactor ("SCR") installation at Cope Station at a total cost of $22 million.
- The Company completed SCR and bag house installation at Wateree at a cost of $5 million.
- The Company initiated the design and procurement for scrubber installations at Williams and Wateree at a cost of $17 million.
- The Company installed cooling towers at the Wateree facility to reduce thermal discharge into the Wateree River at a cost of $65 million.
- The Company installed hub-baffles at its Saluda Hydro plant to increase oxygen levels in the Lower Saluda River at a cost of $476,000.
- The Company installed a new ash pond liner and other ash pond upgrades at Canadys Station to protect ground water quality at a cost of $11 million.

As indicated above, the Company has begun projects to install wet Flue Gas Desulphurization units or "scrubbers" to reduce SO_2 emissions at its Wateree and

Williams Stations. Both of these scrubbers are expected to be in operation by late 2009. SCE&G also has a project underway to install a SCR NOx-reduction unit at Cope Station to be operational in 2009. The total cost of these environmental upgrades is anticipated to be $450 million.

Q. WHY IS THE COMPANY INSTALLING THESE SCRUBBERS AND SCR UNITS AT ITS PLANTS?

A. The scrubbers and SCR units will reduce air emissions as required by the Clean Air Interstate Rule ("CAIR") which imposes much stricter limits on the emissions of SO_2 and NOx from power plants than has previously been required. Under CAIR, SCE&G is being required to make substantial reductions in NOx emissions by 2009 and substantial reductions in SO_2 emissions by 2010. An additional round of reductions will be required by 2015.

In addition, the Clean Air Mercury Rule ("CAMR") applies to coal fired generating plants only and limits total mercury emissions from all such plants in the United States to 38 tons by 2010, and to 15 tons by 2018. SCE&G believes that the scrubbers it is installing at Williams and Wateree will reduce its mercury emissions significantly and allow it to meet the limits required of it under the 2010 standards. The Company is currently studying its options for meeting the 2018 requirements.

Q. WHAT OTHER ENVIRONMENTAL ISSUES IS THE COMPANY FACING?

A. In addition to NOx, SO_2, mercury and other air emissions, the Company believes that the emissions of Green House Gases ("GHG"), specifically carbon dioxide (CO_2), will be regulated in the near future. Presently there are multiple bills in the United States Congress addressing climate change and carbon emissions. Some of these bills focus exclusively on the electric power industry. The Company believes it is likely there will be either a tax on carbon emissions, or a cap and trade system for carbon emissions similar to those for NOx and SO_2. These federal regulations could be in force as soon as 2008 or 2009 and may impose substantial costs on our fossil plant operations.

Q. WHAT IS THE COMPANY DOING TO PREPARE FOR POSSIBLE FEDERAL REGULATIONS ON CARBON EMISSIONS?

A. The Company is positioning itself to respond to these possible new federal regulations on carbon emissions. SCE&G's coal and gas fired units are its primary emitters of CO_2. At standard heat rates, coal plants emit approximately one ton of CO_2 for every one MWh of electricity generated. Combined cycle gas plants emit approximately 0.6 tons of CO_2 per MWh. Producing CO_2 at these plants is unavoidable since much of the energy they generate is a result of converting the carbon and carbon compounds in their fuel source into carbon dioxide through combustion.

Q. HOW DO OTHER GENERATION OPTIONS COMPARE TO COAL AND NATURAL GAS FIRED GENERATION?

A. In contrast, the CO_2 emissions from nuclear facilities are effectively zero. In addition, nuclear plants emit effectively no SO_2, NOx, mercury or particulates. Wind and solar generation have equally low emissions and can provide valuable supplemental energy for the system to the extent they are available and cost effective. But the output of wind and solar assets depends on weather conditions. They may not be able to produce significant power if wind and solar conditions are not favorable. They are not dispatchable since SCE&G cannot ramp up the output of these resources as demand on its system increases. As a result, wind and solar are not viable options at this time for meeting base load capacity requirements. In addition, at present, these alternative energy sources are very expensive even in areas where natural conditions are most favorable for their use.

Another alternative to meet predicted base load needs without increased emission is Demand Side Management or "DSM" programs. DSM programs are designed to reduce the anticipated demands on the system by conservation, or by shifting load to off-peak periods. Perhaps the most successful DSM programs over the years are those programs that have imposed strict energy efficiency standards on new home construction and on new appliances.

At present, there is renewed interest in DSM programs nationwide. The Company is actively evaluating its options for new Demand Side Management programs to reduce future electric demands. However, the renewed interest in DSM is still in an early stage. What the new generation of DSM programs will look like and how effective they will be is not clear at this time. SCE&G is

continuing to evaluate DSM options as they emerge and evolve. But given the growth in demand occurring on its system, and the need for base load generation to meet that demand, DSM programs will not eliminate the new generation resources required at this time.

Q. WHAT ARE THE PRINCIPAL OPTIONS FOR MEETING SCE&G'S SYSTEM DEMAND GIVEN THE CONSTRAINTS YOU MENTION?

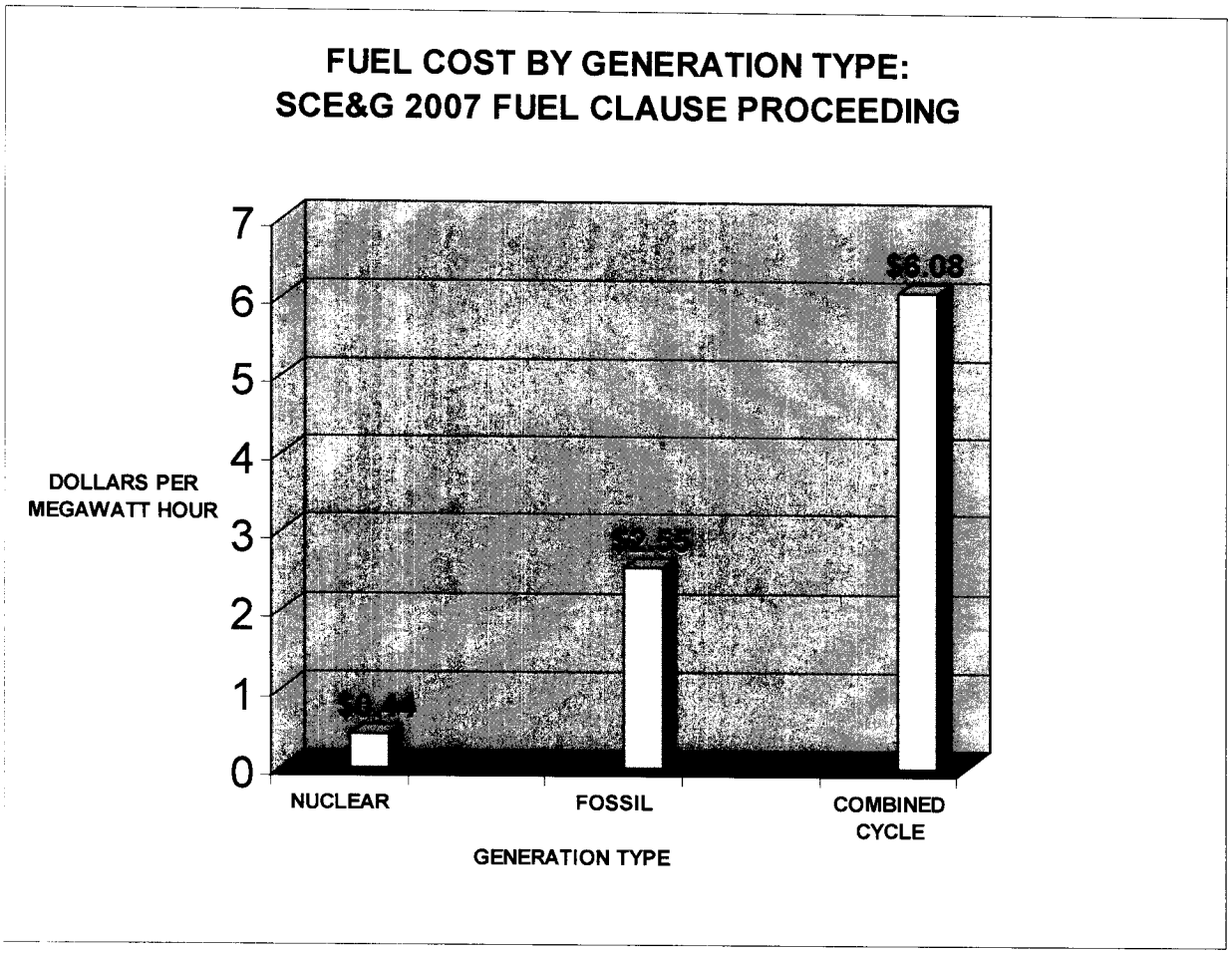
A. Given these constraints, the two primary options for reducing the Company's carbon emissions while maintaining an efficient and reliable electric system are (1) carbon capturing and sequestration (terrestrial and non-terrestrial); and (2) nuclear generation. The most common approaches to terrestrial carbon sequestration involve setting aside and managing forests, grasslands or wetlands to capture the carbon released by generation of electricity. It is not clear whether terrestrial sequestration will be allowed as an off-set to carbon emissions in any new federal regulatory scheme for GHGs. If terrestrial set-off is allowed, it is not clear how regulators would count the amount of additional carbon sequestered as a result of the programs implemented. But under any calculation, the amount of forests or other acreage needed to off-set the carbon emissions from SCE&G's fossil generation plans would very large and would likely be cost prohibitive.

Carbon capturing and sequestration is a more technological approach to remove GHGs from plant emissions. This approach involves stripping CO_2 from a plant's flue gas stream, compressing it, and transporting it under pressure to places where it can be injected into suitable geological formations deep underground or

into the ocean. This technology is in the very early stages of development and testing and is not yet commercially viable. But all indications are that the places where geological or deep sea conditions are suitable for CO_2 injection are limited. The cost of capturing, compressing, and transporting CO_2 and then injecting it into the geological or under-sea repository is likely to be very high. Major new high pressure pipelines will need to be built to link plant sites to sequestration sites. A significant percentage of the energy produced by the plants subject to this technology would be consumed in capturing, compressing and transporting the CO_2. The Company continues to follow the development of carbon sequestration technology closely but this technology does not appear to be a viable option to deal with carbon emissions at this time.

On the other hand, nuclear energy is a proven technology with a history of safe operation in this country. Nuclear energy is cost competitive with coal and natural gas generation, particularly when the cost of carbon taxes or other GHG regulations are considered. In addition, the Energy Policy Act of 2005 contains incentives for companies to invest in nuclear technology making this option even more cost effective. Furthermore, compared to gas fired generation, nuclear energy is much less susceptible to price volatility and interruptions in supply due to events like hurricanes and pipeline freeze-ups. While fuel cost is not the only cost to be considered in such evaluations, it is illustrative of the cost-efficiency of nuclear generation that during period February-January 2006, as reported in SCE&G's most recent fuel clause proceeding, the fuel cost per kWh for coal

generation was nearly six times the fuel cost for nuclear generation. During that same period, the fuel cost for combined cycle gas generation was about 14 times the fuel cost for nuclear generation.



Q. WHAT ABOUT NUCLEAR WASTE ISSUES?

A. New nuclear units will also have the capacity to store up to 18 years of spent fuel safely on site in their spent fuel pools. Dry cask storage is now a well-proven technology, and additional spent fuel can be safely stored on-site in dry cask facilities as long as such on-site storage is needed.

Q. PLEASE PROVIDE A SUMMARY OF WHERE THE COMPANY PRESENTLY STANDS WITH REGARD TO CONSTRUCTING NEW NUCLEAR CAPACITY.

A. The Company's load planning studies have indicated for some time the need for at least 500 MW of new base-load generation capacity in the 2015-2016 period. The Company determined that construction of new nuclear capacity on the site of the present Summer Station in Jenkinsville, South Carolina, would be the most prudent and cost effective means of meeting that need.

For that reason, the Company entered into discussions with Santee-Cooper, its current partner at Summer Station, concerning construction of new nuclear capacity at Summer Station. Santee-Cooper has agreed to partner in that new capacity, and will provide financing for its share of the construction costs. SCE&G will be primarily responsible for construction and operation of the new capacity under a similar arrangement to that which currently exists for the first Summer Station unit. SCE&G and Santee Cooper plan to submit a combined construction and operating license application ("COLA") in the near future. The Company plans to sign an Engineer, Procure and Construct ("EPC") Contract with an engineering and construction company and a nuclear systems supplier for construction of the capacity.

Q. HAS SUCH A CONTRACT BEEN SIGNED?

A. No. An EPC Contract has not been signed as of the date this testimony is pre-filed. However, SCE&G continues to pursue this project actively and will provide

the Commission with further information about the selection of the EPC contractors and the type of unit to be permitted when that information becomes available.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.